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1047

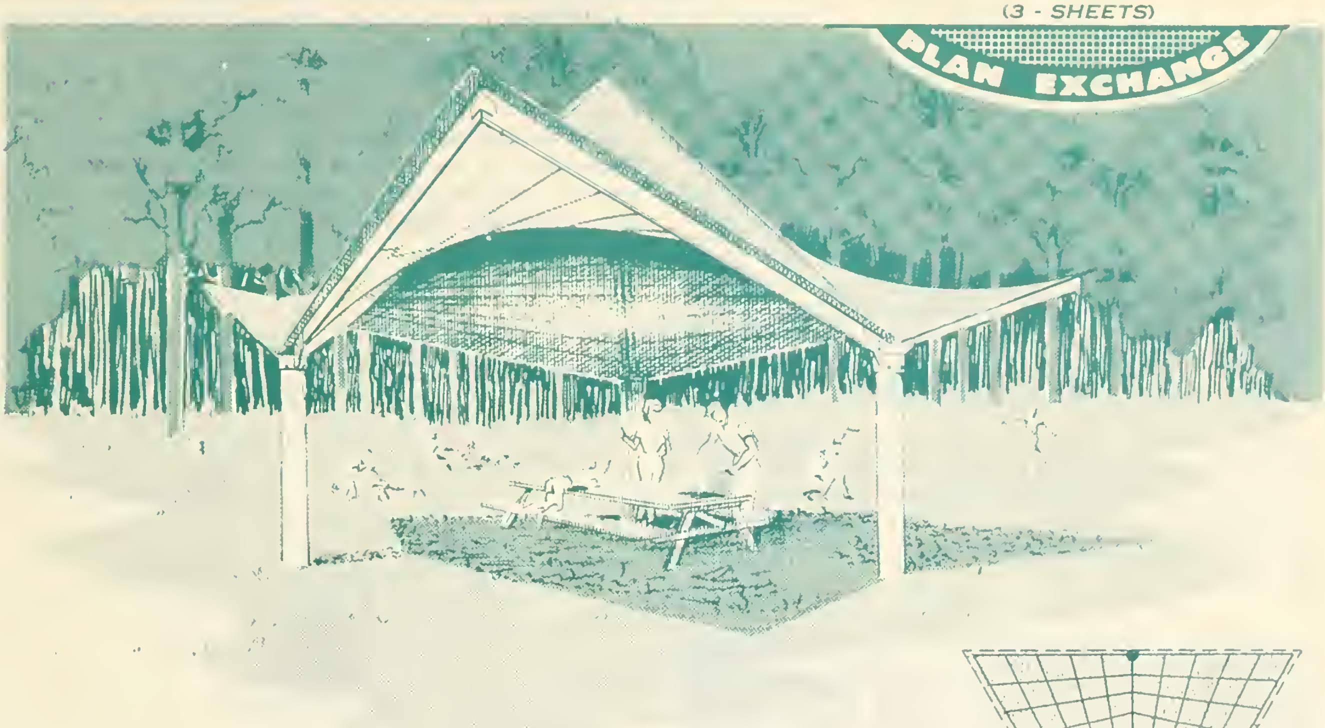
PICNIC SHELTER

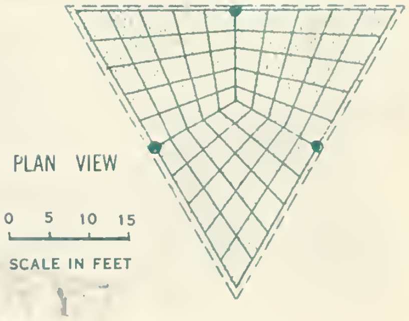
...wood construction

COOPERATIVE FARM BUILDING PLAN EXCHANGE

Plan No. 5995

(3 - SHEETS)





Economy of construction and pleasing architectural appearance make this shelter a unique attraction and landmark for a recreational area.

The roof is especially stable because its long, projecting overhang at the three points of a triangle provides a counterbalance for the high crown. This counterbalancing force eliminates much of the horizontal thrust on the top of the posts. Because thrust is rather negligible, the posts have no tension ties but, instead, are stabilized by concrete collars at the ground surface.

This picnic shelter is designed as a roof, consisting of three doubly warped surfaces supported by three wooden posts 20 feet apart. The roof covers an equilateral triangular area of 693 square feet. Each side is 40 feet long. These doubly warped surfaces are known as hyperbolic paraboloids.

Each of the three surfaces is made by two sets of crossing straight lines that join two opposite edge members (see plan view). In construction, these lines are actually formed by two layers of ¼- x 12-inch hardboard strips that cross each other and are nailed at their ends to 2- x 8-inch edge members (fig. 1). To achieve warping without sagging of the strips, temporary 2- x 4-inch rafters are fastened at quarter points on two opposite edge members (fig. 2).

Before the second layer of strips is laid, the first layer is covered with fiberglass fabric to bridge the gap between strips. After the fabric is in place, the two layers of strips are then bolted together with at least two 5/16-inch carriage bolts at each intersection. When bolting is finished the strips are end trimmed, ridges are covered with roll material, and the overhang is bound with formed angle of sheet metal (fig. 3). The surface thus formed is ready to be weatherproofed by mopping two coats of stabilized asphalt with a three-knot roofing brush. Use additional fiberglass fabric to bridge gaps wherever needed. This procedure applies to all roof surfaces. Rafters and scaffolding can be used again.

Washington, D.C.
January 1967

UNITED STATES DEPARTMENT OF AGRICULTURE Miscellaneous Publication No. 1047

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The asphalt roof coating provides weather protection for about 2 years. At the end of this time, the roof should be remopped to prevent the occurrence of pin holes between the intersections of the hardboard strips.

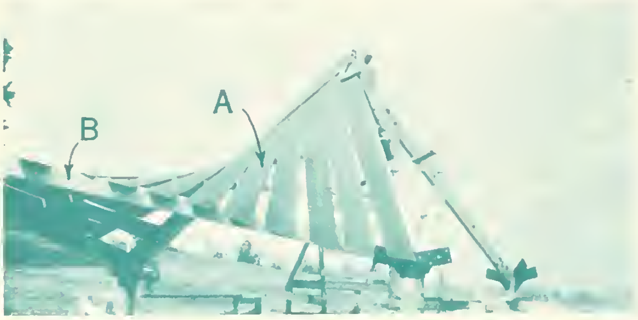


Figure 1. Framing covered by first layer of hardboard strips (A), which are fastened at their ends to edge members (B). Carpenter is nailing the first strip of second layer in place. A single thickness of roofing paper or fiberglass cloth is applied over first layer of strips before second hardboard layer is fastened.

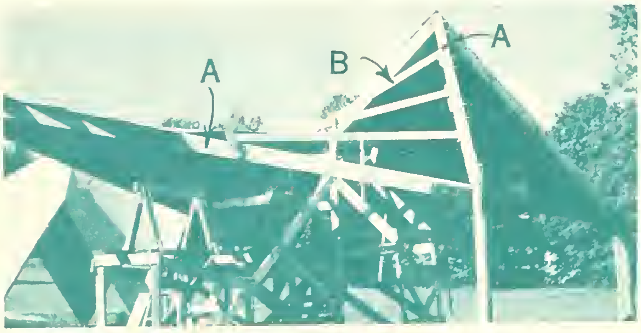


Figure 2. Framing for one of the three doubly warped surfaces, showing edge members (A) and temporary rafters (B). Workman's scaffolding is under the framing.

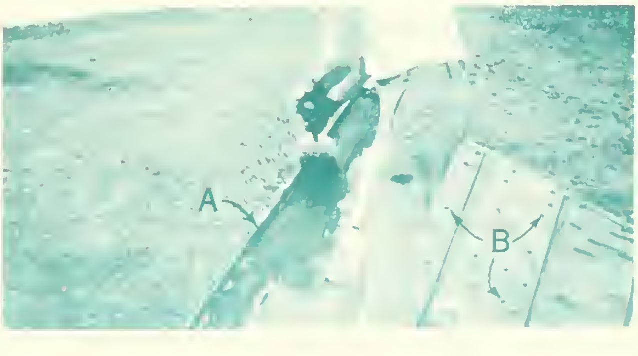
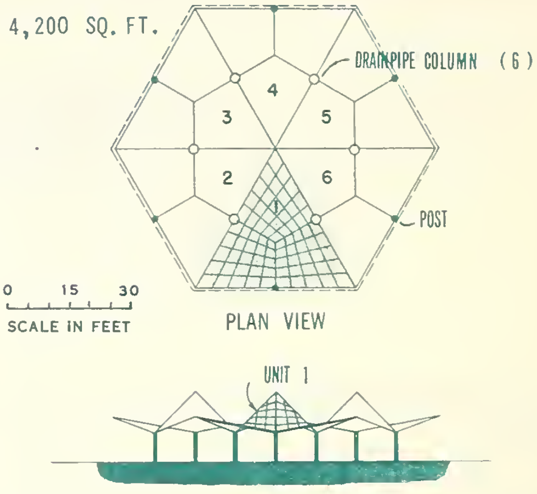


Figure 3. Applying roof coating. Roof overhang is bound by formed angle of sheet metal (A). Layers of hardboard are fastened together by carriage bolts (B).

As shown below in the plan view of a 6-unit layout, additional triangular roof units can be joined to provide a larger shelter. The technique of joining triangular units is made practical by using a 5-inch pipe column instead of a wooden post for interior support. This pipe column then becomes a storm drain through which one-third of the roof water flows to a disposal line installed under the building. Six of these roof units can be joined together to form a hexagonal type of building supported by six wooden posts and six pipe columns, which serve as storm drains for two-thirds of roof water. Since this is a new type of fabrication to which workmen are not accustomed, the cost of fabrication will be higher than the cost of material.

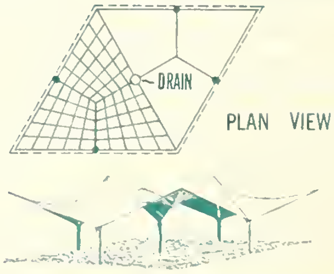
6-UNIT LAYOUT



PLAN VIEW

ELEVATION

DOUBLE UNIT



PLAN VIEW

PERSPECTIVE

Complete working drawings may be obtained from the extension agricultural engineer at your State university. There may be a small charge to cover cost of printing.

If you do not know the location of your State university, send your request to Agricultural Engineer, Federal Extension Service, U.S. Department of Agriculture, Washington, D.C. 20250. He will forward your request to the correct university.

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